INTERNATIONAL INSTITUTE FOR WATER AND ENVIRNOMENTAL ENGINEERING (2IE)

WATER SANITATION AND HYGIENE (WASH) HUMANITARIAN PROGRAM

STATES OF THE EBOLA CRISIS MANAGEMENT IN WEST AFRICA

DISSERTATION IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE AWARD OF SPECIALIZED MASTERS DEGREE IN WATER, SANITATION AND HYGIENE (WASH) HUMANITARIAN

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DEDICATION

I dedicate this work to:

My GOD the Almighty,

Jesus Christ,

My family and

My friends.

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RÉSUMÉ

L'épidémie d'Ebola a été un cauchemar pour la région de l'Afrique de l'Ouest, dévastant tout sur son chemin, prenant les ressources humaines, la croissance économique, laissant le statut socio-économique de la région et à l'échelle mondiale à risque. Certains efforts ont été rassurants mais il y a encore du chemin à faire qui est de maitriser l'Ebola pour le début de la relève et de la résilience complète.

Ce mémoire sur les états de la gestion de la crise du virus Ebola en Afrique de l'Ouest montre comment la réponse à l'EVD en Afrique de l'Ouest a exigé de nombreuses interventions et une lourde coordination moyennant de grandes ressources dans les pays non préparés à l'épidémie, dans un système d'économie et de santé publique faibles mélangé avec la culture et les traditions, sans logistique et les ressources décentes. Réunis, tous ces obstacles ont fait une grosse barrière pour le plan de réponse à l'épidémie d'Ebola dans le contexte où la transmission interhumaine est facilitée par le déplacement, le manque d'information de l'existence de l'Ebola parmi la population attachée à leur culture et où la recherche des contacts est très difficile.

De nombreuses stratégies sont orientées ensemble afin d'empêcher la propagation d'Ebola et arrêter toutes les chaînes de transmission. Dans le secteur WASH les meilleures pratiques d'hygiène sont recommandées pour arrêter l'infection de l'épidémie d'Ebola. Le Sénégal, le Mali et le Nigeria ont réussi à empêcher la propagation de l'Ebola et l'ont contrôlé. C'est avec une forte coordination, la sensibilisation, le renforcement des capacités, des infrastructures de qualité, renforcer la préparation et la riposte à la maladie à virus Ebola, des recherches sur les vaccins qu'on aura une réhabilitation rapide et une résilience complète.

Mots Clés :

1 - Ebola

2 - L'impact socio-économique en Afrique de l'Ouest

3 - la gestion du plan d'intervention stratégique

4 – Réhabilitation et la Résilience

5 – WASH

ABSTRACT

The Ebola Virus Disease (EVD) outbreak has been a nightmare for WEST African region, taking human resources, hindering the economic growth, leaving the socio economic status of the region and globally at risk. Some efforts were made but still there is a remaining step to control it for the early recovery and the full resilience.

The states of management of the Ebola crisis in West Africa demonstrates how the response to the EVD in West Africa required many interventions and strong coordination with big resources in the unprepared countries meeting on the way many challenges, in a weak public health system and economy of countries concerned mixed with the culture and their traditions, without decent logistics and resources. Brought together, those factors made a big barrier for the response plan to the EVD in the context where the human to human transmission is eased by the travelling, the care giving, the missing of information of the existence of the EVD among the population attached to their culture and the contact tracing is very difficult.

Many strategies are geared together in order to prevent the EVD spreading and stop all chains of transmission. In WASH sector the hygienic best practices are recommended to stop the infection of the EVD. Senegal, Mali and Nigeria were able to prevent the spreading of EVD and control it. With strong coordination, raising awareness, capacity building, high quality infrastructure, and preparedness response plan and vaccines researches the early recovery and the full resilience are possible.

Key words:

1 – Ebola

2 – Socio economic impact in West Africa

3 – Strategic Response plan management

4 –Early recovery and Resilience

5 – WASH

ACRONYMS

AfDB	Africa Development Bank
ASEOWA	African Union Support to EBOLA outbreak in West Africa
AUC	African Union Commission
CDC	Centers for Disease Control and Prevention
ECOWAS	Economic Community of West African States
EVD	Ebola virus disease
MSF	Médecins Sans Frontières
NGOs	Non-Governmental Organizations
PPE	Personal Protective Equipment
UN	United Nations
UNCT	UN country teams
UNDP	United Nations Development Program
UNECA	United Nations Economic Commission for Africa
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNICEF	United Nations Children's Fund
UNMEER	UN Mission for Ebola Emergency Response
USAID	United States Agency for International Development
WASH	Water, Sanitation and Hygiene
WHO	World Health Organization

GLOSSARY

Disease: A disease is a particular abnormal condition, a disorder of a structure or function that affects part or all of an organism. (Wikipedia, 2015)

Emergency: An emergency is a situation that poses an immediate risk to health, life, property, or environment. Most emergencies require urgent intervention to prevent a worsening of the situation, although in some situations, mitigation may not be possible and agencies may only be able to offer palliative care for the aftermath. (Wikipedia, 2015)

Emergency response plan: An Emergency Response Plan is a plan of action for the efficient deployment and coordination of services, agencies and personnel to provide the earliest possible response to an emergency. (Management, 2011)

Endemic: In epidemiology, an infection is said to be endemic in a population when that infection is maintained in the population without the need for external inputs. (Wikipedia, 2015)

Epidemic: is the rapid spread of infectious disease to a large number of people in a given population within a short period of time, usually two weeks or less. (Wikipedia, 2015)

Strategic response plan: The strategic response plan is a response management tool for country-based decision makers, primarily the humanitarian coordinator (HC) and humanitarian country team (HCT), but also agency and non-governmental organization directors, managers and cluster coordinators. Its purpose is to support strategic decision making based on solid analysis of the needs and concerns of the affected people. (OCHA, 2015)

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I. GENERAL INTRODUCTION

1.1. Background

The outbreak of the Ebola Virus Disease (EVD) in West Africa is unforgettable in the African history, a nightmare and the fear for African population, unprecedented in its scale, severity, and complexity. The West African countries especially Guinea, have been and are still affected by this outbreak, and are struggling to manage and control the epidemic within an extreme poverty and weak health systems and social customs which foster the easy the EVD human-to-human transmission. While encouraging progress has been made, there is still a considerable effort required to stop all chains of transmission in the affected countries, prevent the spread of the disease to neighboring countries and to safely re-activate lifesaving essential health services. (WHO, WHO STRATEGIC RESPONSE PLAN West Africa Ebola Outbreak, 2015)

Beyond the death toll of the current outbreak of Ebola virus disease (EVD), the disease has notable impacts on the three affected Countries—Guinea, Liberia and Sierra Leone through two channels. Firstly, the health and humanitarian response requires human and financial resources that were unplanned, as well as reallocation of resources slated for other development efforts. Secondly there are impacts on socioeconomic conditions not only in the three countries but also in their neighbors, West Africa, the continent and even worldwide economy. (United Nations Economic Commission for Africa, 2015)

On May 9, 2015, a year after the outbreak began, the WHO declared the end of the EVD outbreak in Liberia, but at the end of June 2015, a new case was reported. There are still cases reporting in Guinea and Sierra Leone. The situation in Liberia shows us how important and a needed it is to maintain surveillance and response capacity even after an outbreak is over. The Ebola epidemic has been one of the most challenging global public health emergencies in recent times. The size and scope of this epidemic illustrate the need for stronger, sustainable disease detection and prevention capacity worldwide. (CDC, 2015)

The states of EVD crises management in West African is the description on how the immergence responses and strategic plans have been addressed and rectified in order to counterattack the EVD towards the eradication and a resilience against EVD in West Africa, the realization and expectations of the efforts given in promotion on EVD, the researches and trainings of deployed nurses in three West Africa most touched countries from the outbreak time up to date.

1.2. Objectives

1.2.1 General Objective

The global objective is to review the management states of EVD crisis in West Africa to outline the various management strategies.

1.2.2 Specific objectives

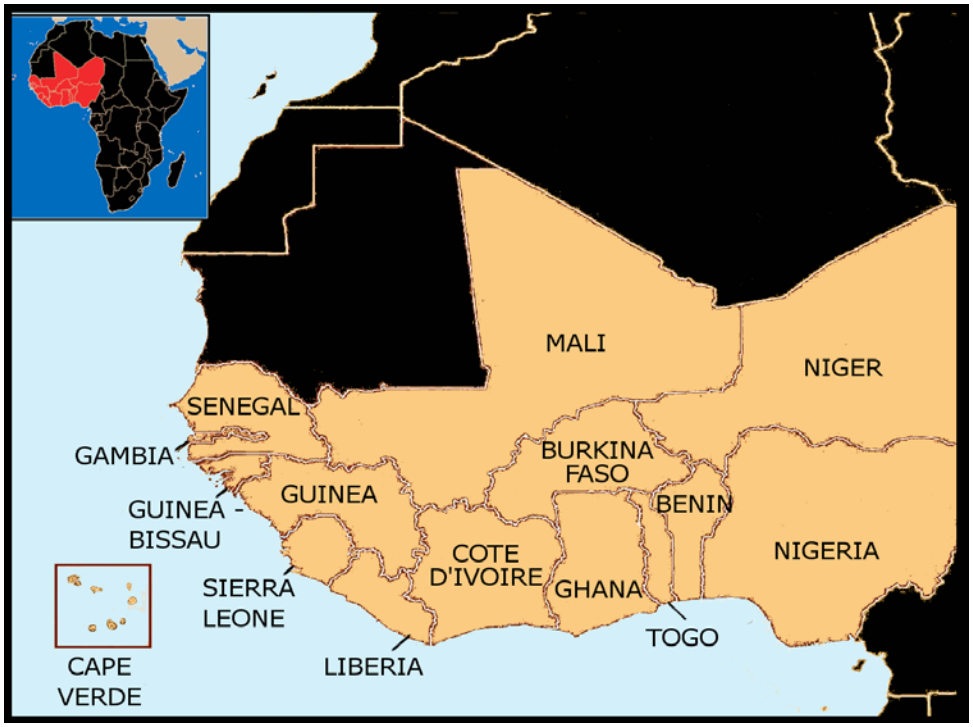
In this thesis the focus will be based on:

1. To outline the strategies for intervention of EVD
2. The impact of the EVD in WEST Africa
3. The WASH response of the EVD, the resilience

1.3. Scope of the work

Our study area is the in West African countries. The West Africa is composed by 18 following countries: Benin, Burkina Faso, the island of Cape Verde, Gambia, Ghana, Guinea, Guinea-Bissau, Ivory Coast, Liberia, Mali, Mauritania, Niger, Nigeria, the island of Saint Helena, Senegal, Sierra Leone, Sao Tome and Principe and Togo.

Map 1: The region map of the West Africa in the Africa

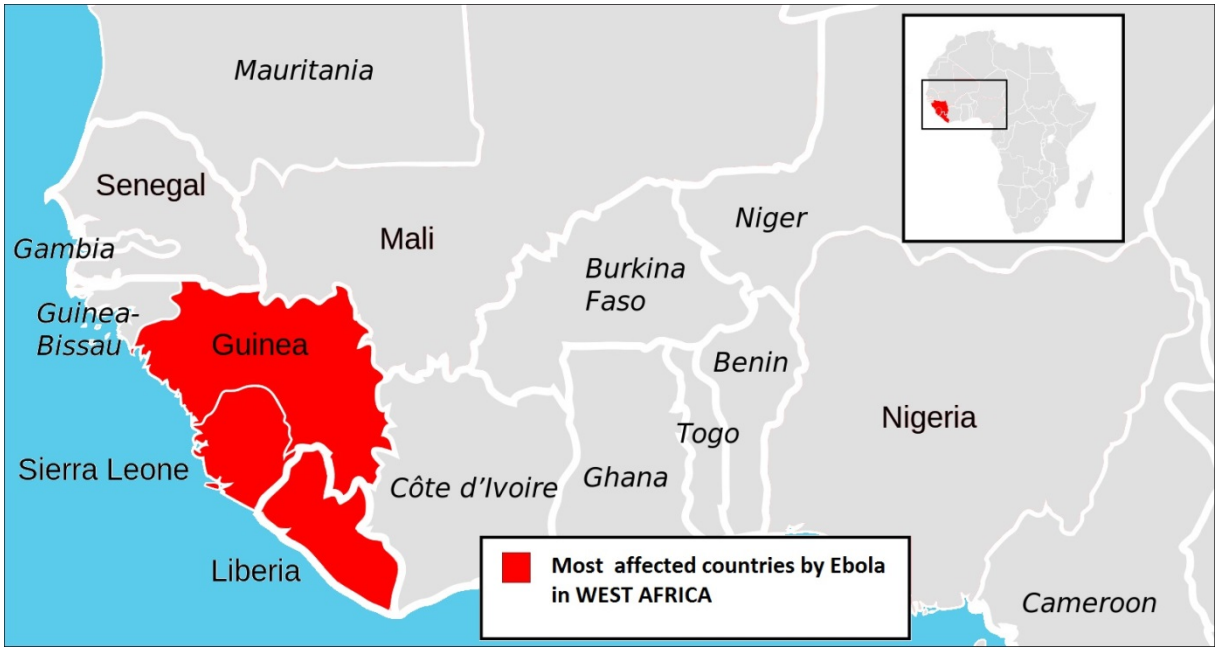


(Wikipedia, 2015)

Due to the outbreak impact of the EVD our study will be focused in three more touched

countries which are Guinea, Liberia and Sierra Leone.

Map 2: The map of the most affected EVD countries in WEST AFRICA



(ZeLonewolf, 2014)

1.4. Structure

This work consists of 4 chapters: the 1st is General Introduction which talks about the context, the scope and objectives of this report; the 2nd the Methodologies and generalities gives the overview about EVD, factors which helped the spreading of the EVD and the economic, socio economic impacts: the 3rd consist of discussions and analysis in WASH and all intervention done: and the last one is the Conclusion and recommendations and limitation of the work.

II. METHODOLOGY AND GENERALITIES

2.1. Methodology

2.1.1. Literature review

The methods used here consist of consulting publications, documentations, web site consulting to get the information necessary for the dissertation. The most of the documentation are from NGOs publications, websites, publication from government's health and public ministries in West Africa, websites and other documents relevant to the EVD.

2.2. About Ebola virus disease (EVD)

2.2.1. History

In 1967 laboratory personnel in the city Marburg, Germany, fell sick and several died after being in contact with monkeys imported from Uganda. The virus identified causing the disease, was named after this city town. In 1976 several people died in South-Sudan and in a bordering region in North Zaire (currently referred to as the Democratic Republic of the Congo) near the river Ebola. The name Ebola then took origin. Since these discoveries of the 2 viruses more outbreaks of Ebola and Marburg have been recognized in and around the Congo basin in central Africa. (Esther Sterk, 2008).The table below shows the cumulative number cases and deaths world wide data up to 18 October 2015.

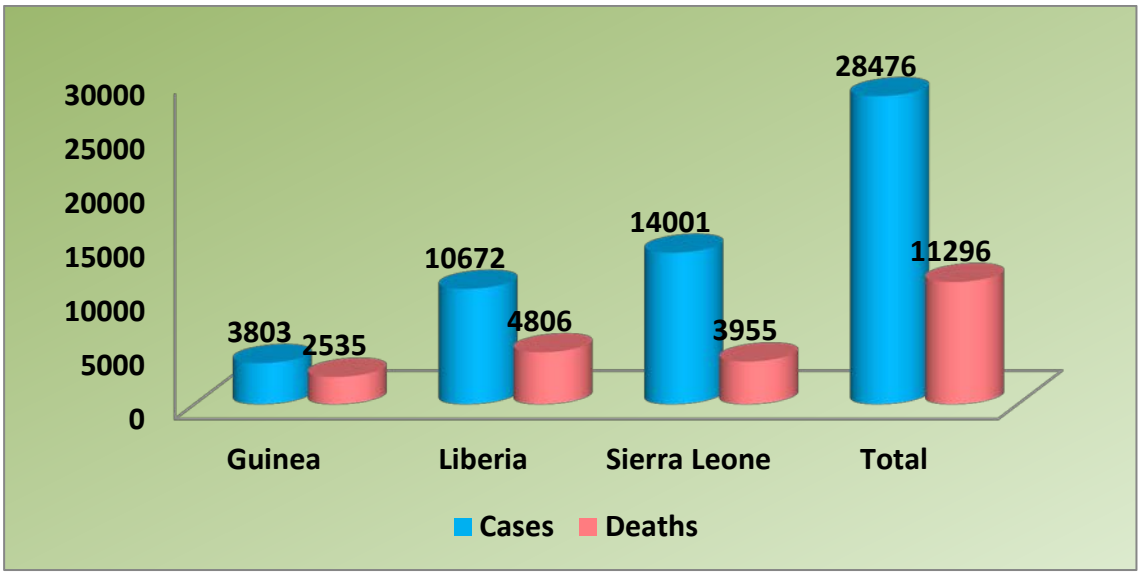
Table 1 : The cumulative number cases and deaths world wide data up to 18 October 2015

Country	**Cases**	**Death**
Guinea	3803	2535
Liberia	10672	4808
Sierra Leone	14001	3955
Italy	1	0
Mali	8	6
Nigeria	20	8
Senegal	1	0
Spain	1	0
United Kingdom	1	0
USA	4	1
Total	**28512**	**11313**

(WHO, Ebola Situation Report - 21 October 2015|WHO, 2015)

Here follows a cumulative table of cases and deaths in Guinea, Liberia, and Sierra Leone the three West African most affected countries.

Graphic 1: Cumulative table of EVD cases and deaths in Guinea, Liberia, and Sierra Leone up to 18 october 2015



(WHO, Ebola Situation Report - 21 October 2015|WHO, 2015)

2.2.2. The microbiological agent

The Ebola virus and the Marburg virus together form the family of Filoviridae. The Filoviruses are thread-like RNA viruses that cause haemorrhagic fever.

The Filoviruses cause severe disease in humans and non-human primates with an extremely high case fatality rate in humans ranging from 25 – 90% depending on the subtype and the given medical care. Hemorrhagic symptoms occur in about 30-50% of described human cases.There 5 types of Filovirus Haemorrhagic Fever. (Esther Sterk, 2008)

Table 2:Table of Filovirus Haemorragic Fever, origin and their case fatality

Subtype	Origins	Case fatality rate
1. Marburg virus	Identified in 1967 in Germany.	25-90%
2. Ebola Zaire (EBO-Z)	Identified in 1976 in former Zaire.	70-90% for human.
3. Ebola Sudan (EBO-S)	Identified in 1976 in South Sudan. Case	50-70% for human.
4. Ebola Reston	Identified in 1989 in Reston (USA) in a	

(EBO-R)	primate centre with imported monkeys from the Philippines. Few humans got infected, but didn't develop symptoms.	
5. Ebola Ivory Coast (EBO-IC)	Identified in 1994 in Ivory Coast, caused 2 symptomatic non-lethal human infections, but high mortality within chimpanzees in a nature park.	
6. Ebola Uganda (EBO-U)	Identified in 2007 in Uganda.	± 25% for human.

(Esther Sterk, 2008)

2.2.3.Reservoir

The natural reservoir of the Ebola and Marburg viruses remains unknown.

The transmission dynamics and often rapidly fatal nature of the disease mean that humans and non- human primates are not likely to be the natural reservoir. Traces of filovirus infection have been found in some species of bat in tropical Africa, although the significance of this is not yet certain. Once the first human gets infected, human-to-human transmission can occur. (Esther Sterk, 2008)

2.2.4.Modes of transmission

1. **Contact with the natural reservoir or infected animals:** (Esther Sterk, 2008)

Humans can be infected after being in contact with the unknown natural host or an infected animal. This is an uncommon way of transmission, but has to occur at least once to initiate an outbreak.

2. **Direct contact with infected body fluids of an infected patient:** (Esther Sterk, 2008)

Contact with blood, urine, excreta, vomit, saliva, sweat, mother's milk, organs, body parts, secretions and sperm (the virus can be found in semen up to 3 months after clinical recovery of Marburg infection) can lead to infection and this is the major mode of transmission in most outbreaks.

There are five routes of infection are:

a. oral
b. the conjunctivae
c. after mucous-membrane exposure: nose and mouth

d. via sexual intercourse
e. via a break in the skin via a penetrating object infected with body fluids of a patient, e.g. needles or razor blades. Infections occur when health staff or relatives are taking care of a patient without proper protection of PPE.

3. **Contact with infected corpses (human or animal):** (Esther Sterk, 2008)

Bodies of deceased patients or animals that died of FHF infection are highly contagious because of the high levels of virus in the corpses. Often traditional burial rituals consist of washing and touching the body to prepare the body to be returned to the ancestors. People touching and washing the corpse are at high risk to contract the disease and this is a well-documented, major mode of transmission.

4. **Nosocomial transmission**:

(Esther Sterk, 2008)

Needles, syringes and material contaminated with infected fluids, can cause infections in health staff and patients. When medical items are re-used without adequate sterilization on patients attending a health facility, numerous people and health workers can get infected. If no hand washing with disinfectant takes place between two consulting patients, infections can easily get spread between health workers, and from health staff to other patients. The importance of this mode of transmission has shown to vary from outbreak to outbreak. Burial ceremonies in which mourners have direct contact with the body of the deceased person can also play a role in the transmission of EVD.

2.2.5.Period of communicability

The period between exposure and development of symptoms is thought to be a minimum of 2 days. During the incubation period the patient is infected with the virus, with no signs but is asymptomatic and is not contagious. The Incubation time for Ebola and Marburg is 2-21days. During the first days of symptoms the levels of the virus increases and therefore its communicability increases rapidly. If the patient doesn't manage to establish a proper immune response, then the sickness will develop to death. The corpse of a patient who died of FHF infection is therefore highly contagious. If the immune response is sufficient, then the level of virus decreases gradually until recovery. (Esther Sterk, 2008)

2.2.6.Clinical symptoms (Esther Sterk, 2008)

Ebola and Marburg viruses cause similar symptoms. Symptoms start generally and are similar to common tropical diseases like malaria, shigellosis or typhoid. A clinical

diagnosis is therefore difficult. Symptoms develop progressively and filovirus infections can kill rapidly.

EVD is often characterized by the sudden onset of fever, intense weakness, muscle pain, headache and sore throat. This is followed by vomiting, diarrhoea, rash, impaired kidney and liver function, and in some cases, both internal and external bleeding. Laboratory findings include low white blood cell and platelet counts and elevated liver enzymes. (Esther Sterk, 2008)

2.2.7. Treatment (Esther Sterk, 2008)

Severely ill patients require cautious intensive supportive care. Patients are frequently dehydrated and require oral rehydration with solutions containing electrolytes or intravenous fluids. Promising vaccines are in development, but are not yet ready for field use. No licensed specific treatment is available for use in people or animals. (Esther Sterk, 2008).

2.2.8. Safe and dignified burial of a dead patient suspected or confirmed EVD

(Esther Sterk, 2008)

WHO has put in place developed a protocol on the safe management of burial of patients who died from suspected or confirmed EVD. These measures has to be respcetd by by medical personnel and every one anyone involved in the burial management of suspected or confirmed EVD patients.

Figure 1 : Safe and dignified burial

(CDC, 2015)

12 steps for safe and dignified burial for an EVD dead case

(WHO, Field Situation:How to conduct safe and dignified burial of a patient who has died from suspected or confirmed Ebola virus disease, 2014)

1. Prior to departure: Team composition and preparation of disinfectants
2. Assemble all necessary equipment
3. Arrival at deceased patient home: prepare burial with family and evaluate risks
4. Put on all Personal ProtectiveEquipment (PPE)
5. Placement of the body in the body bag
6. Placement of the body bag in a coffin where culturally appropriate
7. Sanitize family's environment
8. Remove PPE, manage waste and perform hand hygiene
9. Transport the coffin or the body bag to the cemetery
10. Burial at the cemetery: place coffin or body bag into the grave.
11. Burial at the cemetery: engaging community for prayers as this dissipates tensions and provides a peaceful time.
12. Return to the hospital or team headquarters. *(WHO, Field Situation:How to conduct safe and dignified burial of a patient who has died from suspected or confirmed Ebola virus disease, 2014)*

2.3. The factors which reinforced the EVD spreading in West Africa *(WHO, WHO | Factors that contributed to undetected spread of the Ebola virus and impeded rapid containment, 2015)*

The Liberia, Guinea and Sierra Leone were no aware that the EVD was there in the time they started to know its presence. Countries were deeply attacked. Here are factors which influenced the EVD spreading and not easily controllable.

2.3.1. An old disease in a new context (WHO,2015)

The EVD was known in Democratic Republic of Congo. But it was new in West Africa. The three most affected countries were not aware and were not prepared at all.

2.3.2. Damaged public health infrastructures (WHO,2015)

Guinea, Liberia, and Sierra Leone are among the poorest countries in the world, coming from years of civil war the health infrastructures were seriously destroyed. The transportation system and the logistic which could help the response do not fit.

2.3.3. High population mobility across porous borders (WHO,2015)

The populations in three affected countries move from a country to another for the daily livelihood and commercial purpose. This created an easy human to human transmission of the EVD. Due to the lack of beds people crossed borders to search the help and some because of traditional beliefs carried their loved ones to be buried in their home countries.

2.3.4. Severe shortage of health care workers (WHO,2015)

Before the outbreak the three countries had a ratio of only one to two doctors per nearly 100,000 populations. The fact that health workers got infected reduced their number. Those who didn't get infected at the health center become infected in their community as the EVD spreading was high. Because some hygiene practices are not followed such as hands wash with soap. MSF had more than 3,400 staff working in the affected countries. Of these staff, 27 became infected with Ebola and 13 of them died.

2.3.5. Cultural beliefs and behavioral practices (WHO,2015)

In the three countries the burial practices is the one of the most contagious way of the EVD. It is the same thing in Equatorial Africa during the EVD outbreak. In Liberia and Sierra Leone as they have secret societies practicing the washing the dead bodies and bath in the water which they used to wash and sleep near the dead body several hours to gain powers from him it was the easiest way to get infected and spread the disease with only one person to many others. The culture doesn't have to be fought during the health but to work with it.

2.3.6. Reliance on traditional healers(WHO,2015)

Traditional healers and herbalist have a big history in Africa. Some people preferred to go to search for traditional healers than going to health care centers facility. And when the EVD

were spreading the healthcare facilities and hospitals with barbed wire seemed to be more prisons than healthcare facility which reinforced to go to consult traditional healers than going to search a cure in health care center.

2.3.7. Community resistance, strikes by health care workers (WHO,2015)

People didn't like the way health workers were wearing PPE. They were not agreeing the way they response were being implemented. In some places people saying that the health workers were the origin of the disease which pushed patients to stay at home and spread the EVD though home care. The late response to the call of the ambulance put people to work in their way thus enhancing the spread of the EVD. Burial supervised by military services is not always dignifying as in some cultures people would like to touch the corpse before the burial. Staff strikes also didn't allow the easy containment of the EVD because they were not paid timely and were obliged some times to work without all safety conditions where some of their colleagues died.

2.3.8. Public health messages that fuelled hopelessness and despair (WHO,2015)

During the outbreak of EVD the messages given were confirming how the EVD was incurable. People in despair preferred to stay at home and die in front of their loved ones. After the decimation some complete household people saw the danger of the disease and start to avoid giving home cares. The lack of beds also didn't give them choice. And people who brought their loved ones in healthcare centre were not happy as it was impossible to know the information or the burial place. Even after the beds were available people still didn't come to health centres. That's why the dead has to be tested for EVD before he can be given to the family for an ordinary burial.

2.3.9. Spread by international air travel (WHO,2015)

The arriving of EVD in USA showed that it can go reach everywhere I the world. So the screening at the entry and exit were put in place to reduce the spreading of the disease.

2.3.10. Background noise from endemic infectious diseases (WHO,2015)

The symptoms of the EVD mimic the early symptoms of malaria, for example, are indistinguishable from those of Ebola, Cholera and Lassa Fever which like EVD is an hemorrhagic fever.

2.3.11. A virus with different clinical and epidemiological features (WHO,2015)

The recent discoveries permitted to find that the virus which is in the West Africa is different with the one in Equatorial Africa. This make the specialists to say that the long tenure of the epidemic can reinforce the spreading of the EVD and change in forms.

2.3.12.A fire in a peat bog (WHO,2015)

During 2014, the outbreaks in West Africa behaved like a fire in a peat bog that flares up on the surface and is stamped out, but continues to smolder underground, flaring up again in the same place or somewhere else. Unlike other humanitarian crises, like an earthquake or a flood, which are static, the Ebola virus was constantly and often invisibly on the move.

2.3.13. The long duration of the outbreaks (WHO,2015)

The Ebola outbreak demonstrated the lack of international capacity to respond to a severe, sustained, and geographically dispersed public health crisis. Governments and their partners, including WHO, were overwhelmed by unprecedented demands driven by culture and geography as well as logistical challenges. Together, these and other factors, including the behavior of the virus, created a volatile situation that evaded conventional control measures and constantly delivered surprises.

2.3.14. Doing unfamiliar work (WHO, 2015)

Many organizations and agencies took on technical work normally handled by public health experts. UNFPA, for example, undertook contact tracing. The charity Save the Children assumed responsibility for managing a treatment centre built by the UK government in Kerry Town, Sierra Leone. As the year drew to a close, several charities were struggling to care for Ebola orphans, estimated by some to number more than 30,000 in the three countries.

Poverty, the heavy stigma attached to this disease, and the speed with which it can devastate a village made it difficult to find homes for orphaned children.

2.4. Impact of EVD in West African *(Group, The economic impacT of The 2014 ebola: epidemic Short- and Medium-Term Estimates for West Africa., 2014)*

2.4.1 Economic impact

The impact of the EVD on economic operates through two distinct channels:

- **Direct and indirect effects of the sickness and human loss**:, which consume health-care resources and subtract people either temporarily or permanently from the labor force.
- **Behavioral effects resulting from the fear of to be infected**, which in turn leads to a fear of association with others and reduces labor force participation, people don't get out no more for work, the transportation is lowered , some governments close land borders and restrict entry of citizens from affected countries, travel cancellation and commerce by canceling scheduled commercial flights and reducing shipping and cargo services.

The first of these channels, consisting of the labor force and health expenditure impacts arising from the direct and indirect effects of the epidemic. The second one there is a chance that people may change the behavior after being instructed. Governments have resumed economic activities with measures for preventing the EVD. *(Group, The economic impacT of The 2014 ebola: epidemic Short- and Medium-Term Estimates for West Africa., 2014)*

2.4.2. Economic Impact of the EVD on Guinea, Liberia, and Sierra Leone

The EVD continues to cripple the economies of Guinea, Liberia, and Sierra Leone which were already having weak economy and weak health care. Since mid-2014 all three economies have seen flat or negative income growth. All three were growing briskly in the first half of 2014. But full-year 2014 growth in Guinea collapsed to an estimated 0.5 percent from a rate of 4.5 percent expected before the crisis. Full-year growth for 2014 in Liberia reduced by more than half to an estimated 2.2 percent from 5.9 percent expected before the crisis. Full-year 2014 growth in Sierra Leone fell by more than half to 4.0 percent from 11.3 percent expected before the crisis. All three of these rates imply shrinking economies in the second half of 2014. The total fiscal impact felt by the three countries in 2014 was over half a

billion dollars. These projections forecast the lost income across the three countries in 2015 of about $1.6 billion (about $500 million for Guinea, $200 million for Liberia, and$900 billion for Sierra Leone). (Group , 2015)

2.4.3. Economic Impact on Sub-Saharan Africa (UNECA, 2015)

Travel and tourism creates economic opportunity for the wellbeing of the country economy. One in every 20 jobs in Africa implicates the tourism and travel industry and many more are supported indirectly by the sector.

There has been large variation in level of impact. Some tourism destinations have reported a significant decline in 2014 and expected 2015 visitor numbers (e.g., The Gambia and Senegal) while other destinations have not reported any Ebola-related impact (e.g., Cabo Verde). Whilst the media has reported a significant drop in high-end tourism bookings (e.g., focusing on safari holidays in South Africa,

Tanzania, and Kenya), a lack of hard data, booking lags, and seasonal factors prevent precise assessment of the impact of declines in high-end tourism on economic growth. Feedback from the World Bank's teams of country economists suggests that these effects are not large enough to have a palpable effect on national accounts, however. Some countries closed their borders and implemented severe control at the borders. Some people feared to travel for business, commercial or other purpose. (Group, The Economic Impact of Ebola on Sub-Saharan Africa: Updated Estimates for 2015, 2015)

Table 3:Main Economic Impact outside Directly Affected Countries in 2015

Level of impact	Countries Affected	Description	Impact Estimate for 2015 (in Lost GDP)
Some indirect impact on GDP	1. The Gambia 2. Senegal 3. Mali 4. Nigeria 5. Burkina Faso 6. Côte d'Ivoire	Lost trade through closed borders, disrupted supply chains, marked reduction in travel and tourism, and cancellation of international events.	**$550 million**

Slight but traceable impact on GDP	7. Tanzania 8. Kenya 9. South Africa	Reported reduction in travel and tourism Bookings for 2015	
Negligible impact on GDP	10. Rest of sub-Saharan Africa	Small loss of commerce and drop in tourism (through aversion behavior), but too small to detect in national accounts.	

Source: World Bank calculations. (Group, The Economic Impact of Ebola on Sub-Saharan Africa: Updated Estimates for 2015, 2015)

2.4.4. Social Economic impact in Guinea, Liberia and Sierra Leone (UNECA, 2015)

From a social perspective, there is a rise in morbidity and mortality for those infected. The treatment of patients requires a very delicate and comprehensive protocol that demands specialized training and equipment, ideally procured before an outbreak to provide for incremental capacity building of the health system within a weak health system. It implicates big health budgets and a shift of resources, impacting on regular health service provision. Hence national capacity to care for other infectious diseases (such as malaria and yellow fever) and regular health services (such as antenatal care and vaccinations) are affected, potentially generating a rise in morbidity and mortality resulting indirectly from EVD. Governments have to stop activities in other areas such as public works and by increasing the fiscal deficit.

The provision of social protection schemes and social safety nets may also be affected both operationally and from an outcome perspective. The interruption of some activities brings back the step taken such as child protection, violence against women etc.

Educational services have also been touched: the immediate budget losses are not yet known because teachers' wages still need to be paid and facilities maintained. Further out the consequences could well be far- reaching, as the lack of educational activity may increase the probability of dropping out of school, as older children engage in support activities and take a bigger role in providing for the household's livelihood. The EVD has potential indirect impacts on human capital formation through deteriorated educational outcomes by affecting enrolment, age-appropriate attendance and educational grade achievements for different cohorts of the population. Further, school facilities will have to be brought back to operational

readiness when educational services are resumed, increasing the outbreak's economic impact on educational budgets. (United Nations Economic Commission for Africa, 2015)

2.4.5. Intangible facts (UNECA, 2015)

Through the time the EVD generated "intangible effects" for social cohesion, stigmatization, governance and security, and risk perceptions. When evaluated with the social and economic impacts of EBOLA, the intangible effects could worsen the humanitarian crisis in the immediately affected region. Social cohesion: Since the outbreak of EBOLA in early 2014, social gatherings such as weddings, church meetings, funeral ceremonies and many communal activities have either been abandoned or reduced in three affected countries. This has serious implications for the social cohesion. The governments have to put in place measures to protect the social cohesion and do all possible to alleviate and eliminate the stigmatization in affected countries.

The observed stigmatization observed affected professionals as well as recovered patients.

- For instance, medical personnel (doctors, nurses and clinical officers) can be stigmatized by communities as they are perceived to be vectors of the disease and hence people do not want anything to do with them. This prejudice could well aggravate the spread of EVD as people refuse to come in health facilities for fear of coming into direct contact with medical staff.
- At an institutional level, quarantining patients and suspected victims of EBOLA—though necessary for containing the spread of the disease—can lead to violation of fundamental human rights through imposed restrictions on movement of people and restrictions on their economic activities.
- There was observed the isolation of people who recovered from the EVD. (United Nations Economic Commission for Africa, 2015)

III. ANALYSIS AND DISCUSSIONS

3.1. Strategies for interventions of EVD

3.1.1. WHO strategic Response plan West Africa Outbreak 2015 (WHO,2015)

WHO is the leader to find strategies worldwide in developing the health strategies and approaches required to control and end this Ebola outbreak. WHO is still engaged on the front line, implementing many of the major health interventions. To support the response operation, WHO currently has over 700 staff deployed to all 63 districts, prefectures and counties across the three worst affected countries. This is the first emergency WHO has undertaken.

In all 3 affected countries, WHO has worked with all partners inveolved in this emergency. WHO has collaborated closely with the UN Mission for Ebola Emergency Response (UNMEER) and UN agency partners – especially UNICEF, WFP, OCHA, UNFPA, and UNDP for a good coordination . WHO has also coordinated and collaborated closely with other partner such as the AU, CDC, MSF, IFRC, IOM GOARN to extend coverage of the key surveillance, clinical and public health interventions for the COORDINATED response. WHO is totally committed to strengthening fully these partnerships that are vital to ending the outbreak.

The WHO uses STEPP Strategy with the initial emphasis on slowing the exponential increase in cases that was documented in August September 2014 as quickly as possible. This required a rapid scale-up of treatment facilities, burial capacity and behavioral adaptation to slow the exponential increase in new cases, followed by the rapid scale-up of rigorous case finding, contact tracing and intense community engagement to interrupt residual transmission chains.

The first phase of the strategy successfully tackled the largest outbreak of Ebola ever witnessed and reversed the rapid increase in case numbers seen up until September. The second phase of the strategy has already shown it is possible to reduce cases in both densely populated urban areas as well as remote rural areas, including in Monrovia (Liberia) and the forest areas of Guinea. WHO is working with partners to drive the number of cases to zero.

(WHO, WHO STRATEGIC RESPONSE PLAN West Africa Ebola Outbreak, 2015)

3.1.1.1 Main strategic objectives defined by WHO

The table below cites the outcomes and outputs which have to be implemented in activities in order to bring the EVD to zero in the WHO strategic response plan 2015 West Africa Ebola outbreak.

Table 4:Main strategic objectives defined by WHO

Outcome 1. Stop transmission of the Ebola virus in affected countries

Outputs	1. Strengthened district response operations 2. Enhanced surveillance and contact tracing 3. Community engagement mainstreamed 4. Optimized case management
Outcome 2. Prevent new outbreaks of the Ebola virus in new countries	
Outputs	1. Active surveillance and rapid response capacities in bordering countries 2. Essential readiness capacities in the high priority countries established 3. Global alert and rapid response capacities established
Outcome 3. Safe reactivation of essential health services and increasing resilience	
Outputs	1. Safely reactivate health facilities in affected countries 2. Rebuild short-term health workforce capacity 3. Basic package of essential health services re-established 4. Support planning for the establishment of future resilient health systems
Outcome 4. Fast-track research and development	
Outputs	1. Ebola vaccines fast-tracked 2. Ebola rapid diagnostic test fast-tracked 3. Ebola drug therapies fast-tracked 4. Ebola blood products fast-tracked
Outcome 5. National and international Ebola response coordination	
Outputs	1. Leadership, partner coordination and communications 2. Information management 3. Financial and human resource management 4. Logistics and operations support

(WHO, WHO STRATEGIC RESPONSE PLAN West Africa Ebola Outbreak, 2015)

3.1.2 RESPONSE PLANNED TO THE EVD EPIDEMIC IN GUINEA

Since the EVD was declared on 21 March 2014, the Guinea Government with its involved partners tried to find the response to this outbreak. There was an increasing of the EVD but a new case was reported in June 2014.

The epidemic has also spread to the other two affected countries of Sierra Leone and Liberia, thus giving the crisis a regional dimension. Hence WHO Regional Office for Africa organized an emergency inter-ministerial meeting in Accra, Ghana, on 2-3 July 2014 to enable Member States and all partners to reach a coordinated response regionally.

By 8 July 2014, Guinea had recorded 409 cases and 309 deaths (296 confirmed cases and 197 deaths), i.e. a case fatality rate of 66%. (Guinea, 2014)

3.1.2.1 Specific objectives

The specific objectives addressed were:

1. Strengthening of surveillance of new cases and trace contacts to break the transmission chain.
2. Effectiveness in management of all cases at no financial cost to patients.
3. Preventive Promotion on EVD.
4. Improve the community participation.
5. Good coordination of response activities at all levels.

Monitoring and evaluation

3.1.2.2 Proposed interventions

A. Coordination, finance, and logistiques

This intervention is focused mainly in:

- Strengthening coordination of response activities at all levels
- Monitoring and evaluation under the supervision of the Ministry of Health and Public Hygiene

B. Epidemiology and laboratory

This field is in these following actions:

- Strengthening of early detection of suspected cases and identification of contacts by sharing information and trainings.
- Investigation of suspected cases and deaths by giving equipments, trainings and mobilizing resources to carry out investigations.

C. Case management and infection prevention and control; psycho-social support

To be handled with following actions:

- Rapid and effective case management
- Promotion of infection prevention and control of Ebola virus disease
- Psycho-social support to survivors and sick patients.

D. Social mobilisation, public information, and communications :

By raising awareness of safe and hygiene practices, communication, effective coordination, using micro blogs, videos , traditional communicators, etc. (Guinea, 2014)

3.1.3. Liberia operational plan for accelerated response to re-occurrence of Ebola epidemic

In less than six months Following the confirmation of EVD in Guinea, two main episodes were recorded in Liberia. The first epidemic began on 22 March and ended in April, 2014 and mainly affected two counties. The last case was confirmed on 10 April, 2014. Cumulatively, six cases were confirmed positive of the virus and all died at the time, with Case Fatality Rate [CFR] of 100%. Both episodes of the epidemic were having origin by cross border importation from Guinea.

As of 24 July 2014, the cumulative number of cases recorded is 296 with 147 deaths (CRF = 62%). Already 39 cases recorded among health workers with 17 deaths (CFR = 43.6%).

The Ministry of health in collaboration with partners successfully responded to the first wave of the epidemic and there are concerted efforts to interrupt the current wave of the epidemic.

From onset of the epidemic, a multi-disciplinary National Task Force (NTF) chaired by the Minister of Health and Social Welfare was re-activated in March 2014 to ensure effective coordination of the response efforts to the EVD. The affected counties are being supported to establish a similar Task Force to enhance planning, implementation and monitoring of the epidemic response operations at the local level. (WELFARE, 2014)

3.1.3.1 Undertaken actions and challenges.

A. Actions undertaken

1. Technical from partners to support the Ministry of Health based on comparative advantages and expertise;
2. Emergency medical supplies, including PPE kits mobilized and sent to response counties;

3. case management and infection prevention and control;
4. Treatment centers established
5. contact tracing, and laboratory being implemented
6. Coordination and communication

B. Challenges

1. Weak capacity and equipment for health workers compared to the increasing number
2. Contacts are not systematically followed and often line listing not completed timely.
3. Weak data management
4. exposure of people at the community level due to slow burial
5. Limited participation of senior health workers and managers in public and private health facilities in training sessions organized on Ebola;
6. resistance and denial in both rural and urban areas
7. High exposure of health workers
8. No coordination at the county level
9. Weak health system is weak
10. Lack of experience of health workers. (WELFARE, 2014)

3.1.3.2 Goals of the strategy

The goals of the strategy are to:

- Stop transmission of EVD in the affected regions.
- Prevent the spread EVD in non-affected regions through strengthening epidemic preparedness.

3.1.3.3 Specific objectives

1. Good coordination in response implementation
2. Strengthen the detection, surveillance and diagnostic capacity;
3. Strengthen EVD case management and psychosocial support;
4. Promotion and raising the public awareness about EVD

3.1.4. SIERRA LEONE ACCELERATED EBOLA VIRUS DISEASE OUTBREAK RESPONSE PLAN

On 25 May 2014, the Government of Sierra Leone declared an outbreak of Ebola Virus Disease (EVD) in Sierra Leone. This outbreak appears to be a spillover from the on-going outbreak in Guinea and Liberia since March 2014. As of 20th July 2014 a total number of 409 cases have been confirmed positive for EVD and 139 confirmed deaths.

The national authorities worked with partners involved to establish and implement the response measures for EVD even if it continues to spread. (SANITATION, 2014)

3.1.4.1 Challenges

1. The raising awareness on EVD still down.
2. Lack of experience of healthcare workers
3. High exposure to Ebola virus during burial.
4. Denial, mistrust and rejection of proposed public health interventions arising from misinterpretation of the cause of the new disease.
5. The lack of health workers equipment's.
6. Difficulties in tracing and following up of contacts in the three affected countries.
7. Lack of financial and technical resources

3.1.4.2 Goals of the strategy

The goals are the following:

- Stop transmission of EVD with effective coordination and measures;
- Prevent the spread of EVD to the neighboring at-risk regions

3.1.4.3 Specific objectives

1. To ensure effective coordination
2. To strengthen early detection and communication
3. To establish effective case management of all cases
4. To raise awareness about EVD.

3.1.5. UN Strategy of EVD

(UNESCO, 2014)

As the response to this growing EVD, the UN Security Council declared the Ebola outbreak "a threat to international peace and security" and created in September 2014 the first UN emergency health mission on EVD, the UN Mission for Ebola Emergency Response (UNMEER) located in Ghana. WHO meet three most effected countries to develop a road map for the emergency response plan for EVD in July 2014

On 12 August 2014, there has been an appointment of Senior UN System Coordinator for EVD, on 16 September the UN Office for the Coordination of Humanitarian Affairs (OCHA)

released the Ebola virus disease outbreak , the overview of needs and requirements, outlining resources to address the EVD crisis. The UN strategy consists in 5 strategic objectives and 13 mission critical actions. Under the UNMEER, WHO is responsible for overall health strategy coordination and advice within the Mission, in partnership while other UN, international partners including non- governmental organizations (NGOs) on the ground, for a better response to the EVD.

The response has to be implemented without duplication, delays, and gap. From the UN and other stakeholder's side, in addition to UNMEER, a number of different coordination mechanisms have been established to increase the effectiveness during the implementation of the response. Ebola Communication Coordination Call headed by the Centers for Disease Control and Prevention (CDC), which includes a number of different stakeholders such as UNICEF, WHO, IFRC, USAID, IOM, UNAIDS, UNDP and UNESCO.

Given the ongoing response by multiple stakeholders, UNESCO's response is also informed by other relevant strategies and initiatives such as the African Union's. UNESCO's response will be based on needs identified at the country level, through amongst others, UNCT (UN country teams) mapping and prioritization.

3.1.5.1 STRATEGIC OBJECTIVES (STEPP) & 13 MISSION CRITICAL ACTIONS OF UN

The table below shows the 5strategic objectives (STEPP) & 13 mission critical actions of UN.

Table 5:5strategic objectives (STEPP) & 13 mission critical actions of UN.

strategic objectives	mission critical actions
1 STOP the outbreak	1. Identify and Trace people with Ebola 2. Safe and dignified burial
2 TREAT the infected	3. Care for Persons with Ebola and Infection Control 4. Medical Care for Responders
3 ENSURE essential services	5. Provision of Food Security and Nutrition 6. Access to Basic (including non-Ebola Health) Services 7. Cash Incentives for Workers 8. Recovery and Economy
4 PRESERVE	9. Reliable Supplies of Materials and Equipment

stability	10. Transport and Fuel 11. Social Mobilization and Community Engagement 12. Messaging
5 PREVENT outbreaks in countries currently unaffected	13. Multi-faceted approach to strengthen preparedness of all countries to rapidly detect and respond to an Ebola exposure, especially those sharing land borders with areas of active transmission and those with international transportation hubs

(UNESCO, 2014)

3.1.6. AFRICAN UNION RESPONSE TO THE EVD IN WEST AFRICA

(ASEOWA, 2015)

Through its Peace and Security Council and the Executive Committee and the various mechanisms put in place, the AU is working alongside other major actors to bring an end to the spread of the EVD. Convened by the African Union Commission (AUC) and WHO, the AU response to EVD started in April 2014 at the first 1st African Ministers of Health Meeting) in Luanda, Angola. The response was positive. Some AU Member States sent experts to the affected countries.

3.1.6.1 Formation of ASEWA (African Union Support to EBOLA outbreak in West Africa)

Donations given at the time of the meeting (The use of these funds is determined by the funding agreement with the Member States.)

Table 6:Donations given at the time of the meeting

Organization	Date	Amount donated
Union's Special Emergency Assistance Fund for Drought and Famine in Africa	August 2014	1,000,000 $
Special Fund Contributions – IDPs and Refugees	September 2014	100,000 $
The staff members of the African Union	September 2014	100,000 $
Total		1,200,000 $

(ASEOWA, 2015)

3.1.6.2 DECISIONS OF THE AU PEACE AND SECURITY COUNCIL

The Peace and Security Council of the AU met at its 450th meeting in Addis Ababa on 19 August 2014, and adopted decisions on the EVD outbreak in West Africa:

Two key decisions were taken:

1. To authorize the immediate deployment of an AU-led Military-Civil Humanitarian Mission, comprising medical doctors, nurses and other medical and paramedical personnel, as well as military personnel, as required for the effectiveness and protection of the Mission: and,
2. That the Commission should take, without further delay, the necessary steps to develop a Concept of Operations for the AU Mission, including its logistical, financial and other relevant aspects.

ASEOWA team was formed after decisions made in the meeting. The Strategic Task Force comprises representatives from various AU departments, UN agencies, and partners. (ASEOWA, 2015)

3.1.6.3 The Objective of ASEOWA

The ASEOWA Concept of Operations) envisages to bring 1000 health workers in the field, on a rotational basis over a six month period (December 2014-May 2015), they will leave if the EVD is cleared. There are 3 stages of deployment:

a. **Pre-deployment (2 weeks):** the recruitment of health workers and the arrival at ASEOWA, logistics arrangements and departure.
b. **Deployment:** Arrival in Guinea or Liberia or Sierra Leone, training and beginning of the work.
c. **Exit or Rotation**: observation and debriefing, the exit or contact extending.

The first groups of 86 ASEOWA health workers were volunteers who did not come under the banner of their countries from Burundi, Cameroon, Congo, DR Congo, Ethiopia, Kenya Niger, Nigeria, Rwanda, Tanzania, Uganda and Zimbabwe. Others sent by their countries are shown in table below.

Table 7:Workers sent by ASEOWA

ORIGIN	Guinea	Sierra Leone	Liberia	TOTAL
ASEOWA volunteers	21	32	33	86
Nigeria	0	110	86	196

Ethiopia	0	101	86	187
DRC	81	0	0	81
Kenya	0	75	95	170
ECOWAS	49	27	39	115
Total	**151**	**345**	**339**	**835**

(ASEOWA, 2015)

3.1.6.4 Duties of ASEOWA health workers

A. LIBERIA

ASEOWA is managing the 100 in ETU, training of medical teams traditional and religious leaders, youths and women in Liberia, providing epidemiological support in Liberia and supporting the survivors network through awareness campaigns

B. **SIERRA LEONE**

ASEOWA is managing a 100 bed ETU Managing a lab Training the local medical teams and providing epidemiological support.

C. **GUINEA**

In Guinea, ASEOWA is Supporting one 2 ETU and providing epidemiological support.

3.1.6.5 Executive council makes decisions on tackling EVD

An emergency meeting of the Executive Council was held on 8 September 2014. It was called to establish a comprehensive and collective response to the Ebola outbreak. Among the decisions of the Executive Council were that the AU Commission should:

1. Call upon AU Member States to urgently lift all travel bans and restrictions to respect the principle of free movement and that any travel related measures be in line with WHO and International Civil Aviation Organization (ICAO) recommendations, in particular proper screening;
2. Raising the awareness about EVD to the general population and the international community at large.
3. Work closely with Member States, Regional Economic Communities (RECs), international and regional Organizations, Africa's partners, public sector and other relevant actors on the ground, with a view to mobilizing adequate resources to respond

to the EVD crisis, in the spirit of Africa solidarity and global approach and a good coordination;

4. To establish an African Centre for Disease Control and Prevention mid-2015, including the enhancement of the early warning systems to address in a timely and effective manner all the health emergencies and with an effective coordination. USA, EU, China, Norway and Canada have pledged financial support to ASEOWA. USA, EU, China, Norway and Canada have pledged financial support to ASEOWA. (ASEOWA, 2015)

3.2. WASH response to EVD

3.2.1. WASH Package for Ebola Care in Treatment Centres / Units (UNICEF, 2014)

The Centres for Disease Control and Prevention (CDC), World Health Organization (WHO) and Médecins Sans Frontières (MSF) Ebola virus disease (EVD) infection control (IFC) guidelines and protocols state that the Ebola virus can be destroyed by disinfection with 0.5% or 0.05% chlorine solution, through exposure to UV rays and heat, and through hand washing with soap or alcohol rub and water.

The recommended actions are presented under the different components (water supply, hygiene and hand washing, disinfection, solid waste management, latrine and wastewater management, and dead body management) of the defined Ebola Care Centre/Unit WASH package to complement community and house-to-house level interventions.

3.2.1.1. Water Supply (UNICEF, 2014)

Water is required for hydration, disinfection and disposal of waste. To ensure sustained water supply to the Ebola Care Centres and Units, the water suplly system,the storage system, water demand should be taken in account.

The recommendation:

- 100- 400 litres per person in an Ebola Centre.
- For drinking water free residual chlorine at the tap should be between 0.3 and 0.5%
- For washing/laundry, footbath, spraying of foot, and disinfection, free residual chlorine should be 0.5 %.
- Monitor water quality daily and clean storage containers

3.2.1.2. Hygiene and hand washing (UNICEF, 2014)

Hand washing is the one of most important measures to prevent transmission of EVD is to practice routine hand hygiene before and after every patient encounter.

Hand washing with water and soap as a good practice for viral prevention, is part of other measures recommended by WHO to help prevent the spread of Ebola virus. Hygiene education materials and messages should be displayed and visible in all areas of the Ebola Care Centre/Unit.

3.2.1.3. Disinfection (UNICEF, 2014)

To disinfect patient's excreta, vomit, urine in containers/hand wash basins, add 0.5% chlorine to the content and discard into a latrine.

For all other contaminated items such as clothes, bedding used by a suspect or probable EEVD patient, discard in designated waste bag/bin/pit and burn.

3.2.1.4. Solid waste management (UNICEF, 2014)

The approach to solid waste management is to reduce the risks and costs associated with handling and transportation by on site disposal and burning. The area designated for solid waste management should have controlled access to prevent entry by animals, untrained persons. Used bed mattresses of affected patients should be sprayed with 0.5% chlorine solution before burning. Also, biological waste material either buried or burned.

All sharps (including syringes, needles, scalpel blades, cannulas and other sharps) are to be disposed of in puncture-resistant/leak-proof sealed disposable containers designed for sharp medical waste collection before incineration.

All used disposable Personal Protective Equipment (PPE) to be disinfected with cautions

When designing solid waste management pits in Ebola Care Centres/Units, it is important to consider the type of waste generated, wind direction, distance to Centre/Unit, type of geology and topography, distance to water source, availability and suitability of site and number of patient, staff and waste management technicians required.

3.2.1.5. Latrines and Wastewater Treatment (UNICEF, 2014)

Liquid waste such as urine or vomit should be disinfected by pouring 0.5% chlorine solution and safely flushed into the sewer system if there is an adequate sewage system in place.

When designing wastewater management units in Ebola Care Centres/Units, it is important to consider alternative off-site disposal and treatment, distance to Centre/Unit, type of geology and topography, distance to water source, viral load, availability and suitability of ssite and numbers of patient, staff and waste management technicians required.

3.2.1.6. Management of dead bodies (UNICEF, 2014)

Management of corpses requires specialized expertise and should not be undertaken without evaluation of risks and access to relevant expertise.

Access to corpses awaiting transportation for burial needs to be kept under strict control and should strictly follow WHO, CDC and MSF guidelines and protocols. (UNICEF, 2014)

3.2.2. Personal protective equipment (PPE) (UNICEF, 2014)

They equipements required to wear during the treatment of the EVD cases patient. They are also used during burial and when entering the room of the patient. They recommendations and composition are given in (appendix 1: Personal protective equipment (PPE))

3.3. Clinical management of EVD

3.3.1.Case definition

The cases definitions are fixed according to the context

(WHO, http://www.who.int/csr/resources/publications/ebola/case-definition/en/, 2014):

- **Routine surveillance**: it is recommended to use cases defined by WHO routine surveillance notification on EVD:
  - **Suspected Ebola or Marburg: i**llness with fever and no response to treatment area disease characterized by fever, and any bloody symptoms (diarrhoea, bleeding from gums, bleeding into skin ,bleeding into eyes and urine)
  - **Confirmed Ebola or Marburg cases** for routine surveillance:a suspected case with laboratory confirmation
- **Community-based surveillance:** standard case definition defined by the community or community-based volunteers
  - **Alert case:** Illness with onset of fever and no response to treatment of usual causes of fever in the area, combined with bloody symptoms of EVD.
- **During an EVD outbreak: case definitions used by the surveillance:**

A. to be used by mobile teams or health stations and health centres

Suspected case:

- Any person, alive or dead, suffering or having suffered from a sudden onset of high fever and having had contact with a suspected, probable or confirmed EVD,dead or sick animal (for Ebola)
- person with sudden onset of high fever combined with bleeding combined with other at least 3 symptoms of EVD

- A person with a sudden unexplained death

B. To be used by hospitals and surveillance teams:

- ✓ **Probable case**: Any suspected case evaluated by a clinician or any deceased suspected case (where it has not been possible to collect specimens for laboratory confirmation) having an epidemiological link with a confirmed case
- ✓ **Laboratory confirmed case**: Any suspected or probably cases with a positive laboratory result.
- ✓ **Non-case**: Any suspected or probable case with a negative laboratory result.
- ❖ **EVD Contact**
  - **EVD or Marburg case contacts**: Any person having been exposed to a suspect, probable or confirmed case of Ebola or Marburg, less than 21 days before the identification as a contact.
  - **Dead or sick animal contacts:** Any person having been exposed to a sick or dead animal, less than 21 days before the identification
  - **Laboratory contacts**; Any person having been exposed to biological material in a laboratory, less than 21 days before the identification as a contact by surveillance teams. (WHO, http://www.who.int/csr/resources/publications/ebola/case-definition/en/, 2014)

3.3.2.Triage in ECUs/CCCs

(WHO, WHO|Manual for the care and management of patients In Ebola Care Units|Community Care Centres, 2015)

Containing the EVD requires several public health interventions. Much of the care of patients with EVD has taken place in hospitals and Ebola Treatment Centres (ETCs). But because of growing number of EVD patients, governments with WHO and UN put in place establishment of controlled settings, called Ebola Care Units (ECUs) or Community Care Centres (CCCs). These centres permit to follow the patient easily and also reduce the transportation of patients with EVD, a practice that can lead to infections among transporters and helpers.

3.3.3.Rules in ECU/CCC

1. Protect yourself and others from infection.
2. Treat patients with respect and dignity.
3. Make ECUs/CCCs friendly and safe for patients and their families

Triage: Rapid assessment to know if the patient is a suspected case

- patients with suspected Ebola are isolated from others who do not have Ebola to reduce the risk of transmission; and if they need treatment can receive it quickly, to improve their chance of survival;
- Patients who are unwell but likely NOT to have Ebola can be sent home with instructions/medication, or referred for treatment in other health- care facilities. This reduces their risk of infection in facilities where patients with Ebola are being cared for.

Triage area: an area when the triage has to be done. The patients have to respect consigns given by the health workers

3.3.4Clinical treatment

(WHO, WHO|Manual for the care and management of patients In Ebola Care Units|Community Care Centres, 2015)

There are many treatment prescriptions by WHO which are more oriented in medical field. However the treatment takes in account the pregnancy, the breastfeeding women, children and adult nutrition care and malaria patients others are the management of symptoms. (See appendix 2: Principles of treatment in ECUs/CCCs)

Patient deaths in ECUs/CCCs

The management of dead bodies and burials should be performed by a trained team.

3.4. Psychological first aid for EVD affected people

(World Health Organization, CBM, World Vision International & UNICEF, 2014)

Psychological first aid is recommended by many expert groups, including the Inter-Agency Standing Committee (IASC) and the Sphere Project. In 2009, the World Health Organization's (WHO) mental health Gap Action Programme (mhGAP) Guideline Development Group evaluated the evidence for psychological first aid and psychological debriefing. It concluded that psychological first aid, rather than psychological debriefing, should be offered to people in severe distress following recent exposure to a traumatic event.

3.3.1. How do crises affect people

EVD can affect communities in many ways; separation by of death or sickness. For health workers there is high work and a lot of stress. Those associated with Ebola can be vulnerable to social stigma, worsening their distress and isolation. The community is in a permanent fear.

People can react differently. They can feel tired, with confusion, fear, anxiety, or being lost. Factors which can influence reactions are the nature and severity of the disease, the support they have in their life from others, their physical health, family, health problem, culture and tradition, their age.

3.3.2. What is psychological first aid (PFA)

According to the Sphere Project (2011) and IASC (2007), Psychological First Aid (PFA) describes a humane, supportive response to someone who is suffering and may need support. It doesn't need professional. It helps people to feel safe, connected to others with hope, social support and feels confident themselves.

3.3.3. Who can benefit from PFA?

- People recently exposed to an EVD crisis.
- Health workers and people tested EVD negative.

People who need more than PFA in terms of mental health support include:

- people who are so upset that they cannot care for themselves or their children;
- people at risk of hurting themselves;
- People at risk of hurting others.
- People who lost multiple family and loved ones

PFA may also be useful for people who may be stigmatized by their communities, such as:

- people who have recovered from Ebola;
- health care providers treating people with Ebola;
- frontline workers of Ebola operations involved in burial

3.3.4. Respect Safety, Dignity and Rights

It is important when giving PFA to respect safety, dignity and rights without and kind of discrimination.

1. **Safety:**Avoid putting people at further risk of harm as a result of your actions.Make sure, to the best of your ability, that the adults and children you help are safe and protect them from physical or psychological harm.
2. **Dignity:** Treat all people with respect. The situation in areas affected by the Ebola disease especially during the dead body management.
3. **Rights:** Make sure people can access help fairly and without discrimination.Help people to claim their rights and access available support.Act only in the best interest of any person you encounter.

Look after yourself

It is essential to pay extra attention to your own wellbeing and be sure that you are physically and emotionally able to help others. Take care of yourself first, so that you can best care for others. If working in a team, also be aware of the wellbeing of your fellow helpers, and find ways to support each other.

3.3.5. The Action Principles of PFA : 3L

Look, Listen and Link!

Look: Check for safety, check for people with obvious urgent basic needs and check for people with serious distress reactions.

Listen: Approach people who may need support,ask about people's needs and concerns and listen to people, and help them to feel calm.

Link: Help people address basic needs and access services,help people cope with problems,give information and connect people with loved ones and social support.

People who likely need special attention

People who may be vulnerable and need special help in a crisis include: Children, including adolescents, people with health conditions or disabilities and people at risk of discrimination or violence: women, people from certain ethnic or religious groups, and people with mental and physical disabilities.

3.3.6. Health workers

As a helper, you may feel responsible for people's safety and care. You may witness or even directly experience terrible things, such as death, severe illness and suffering, social unrest or violence. You may also hear stories of other people's pain and suffering. All of these experiences can affect you and your fellow helpers.

In managing your stress: Think about what has helped you cope in the past and what you can do to stay strong, try to take time to eat rest and relax, even for short periods, try to keep reasonable working plan shifting, remember that you cannot resolve all problems, minimize excitant (alcohol, caffeine…), find ways to support each other as colleagues and talk with friends, and your family.

3.3.7. Offering psychological first aid to grieving people

If you are offering PFA to bereaved people it is important to:help them feel calm and safe, listen to them and allow them the time and space to feel sad and grieve,if they wish, you can introduce them to others who have been bereaved and encourage them to support each other, allow them the time and space to talk about their loved ones. And If they are struggling to accept that they cannot bury their loved ones in a traditional ceremony, encourage them to

think of alternative ways that they can honor, remember and grieve for them.

Consider engaging religious leaders in helping to develop alternative rituals that are safe for the mourners.

3.4. Tracing of contact

The early detection and prompt isolation of new cases are one of strategies to interrupt the EVD transmission. During an EVD outbreak with established person-to-person transmission, new cases are more likely to emerge among contacts For this reason, it is critical that all potential contacts of suspect, probable and confirmed Ebola cases are systemically identified and put under observation for 21 days from the last day of contact. The evacuation of a contact with signs and symptoms of EVD is recommended (WHO, Contact Tracing During an Outbreak of Ebola Virus Disease, 2014).

Contact tracing is a critical tool for controlling an EVD outbreak, but represents only one aspect of a multifaceted control strategy for EVD. Contact tracing is intricately connected to case finding (surveillance) and case investigation processes; the detection of an EVD case activates the case investigation process, at which time contacts are identified, initiating the contact tracing process. It depends on social mobilization, logistics, case management, and laboratory capacity. There should be a good communication and coordination to have good results. (WHO, Implementation and management of contact tracing for Ebola virus disease , 2015)

3.4.1. Elements of contact tracing

(WHO, Contact Tracing During an Outbreak of Ebola Virus Disease, 2014)

The contact tracing is divided in three main activities: contact identification, contact listing, and contact follow up. Then it follows the managing contacts with signs and symptoms, and contact discharge in the case the contact is tested negative or after 21 day sunder observation he doesn't develop symptoms.(See appendix3: Tracing of contact)

3.5. Exit screening and entering screening at Airports, Ports and Land

(WHO, WHO|Ebola Event Management at Points of Entry|Humanitarian Response, 2014)

(WHO, WHO| Exit Screening at Airports, Ports and Land : Interim Guidance for Ebola Virus Disease, 2014)

Entry and exit screening is a public health intervention to identify persons with possible

symptoms of, or risk of exposure to, EVD, and to prevent them from further travel. Screening measures are based upon symptom assessment and risk and can be adapted for airports, ports and ground crossings. Exit screening should be paired with travel restrictions to prevent the exportation of EVD to other countries, protect travellers and crew, and comply with public health recommendations for exposed or symptomatic persons.

The screening process should include an extensive public health communications campaign to educate travellers and the travel industry. These messages should provide important health information about the outbreak, as well as the intent to screen travellers for signs of disease and risk of exposure to EVD. They are urged to respect process of screening. They must be notified that there is a probable delay in their schedule , to complete forms, to know that they can be denied to board. Temperature measurement will be required.

There is a **primary screening** which consist to identify travellers who may be symptomatic with, or were possibly exposed to, EVD and a **second screening** which concern concerns those travellers identified by primary screening as needing further evaluation for illness or risk of exposure to EVD.

Figure 2 : Screening at the airport

(WHO, WHO|Guinea: screening for Ebola at Conakry International Airport, 2014)WHO/C. Black

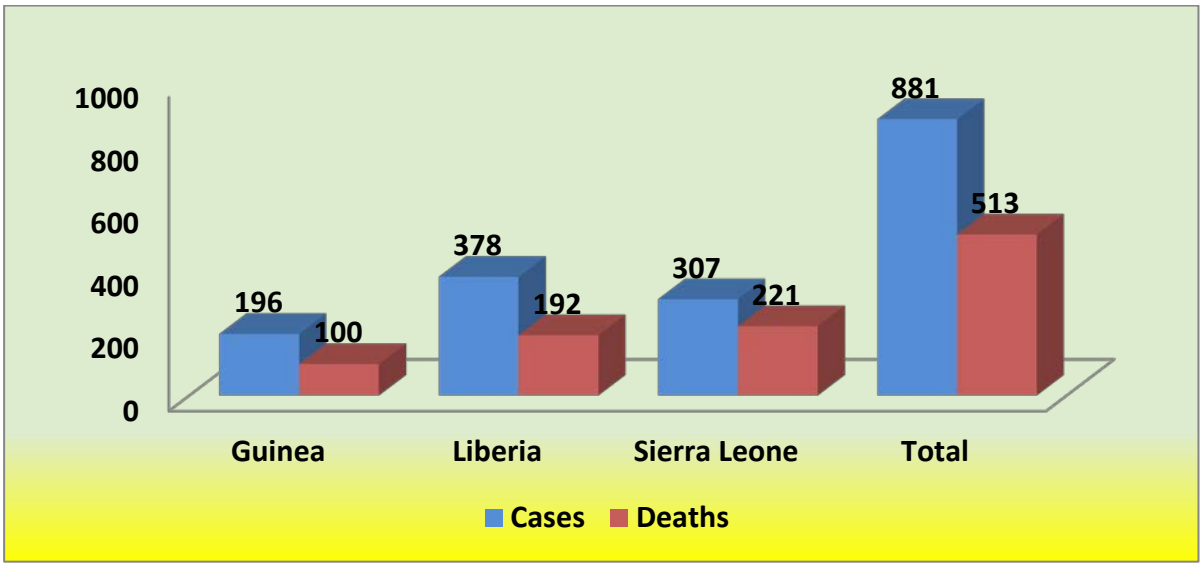
3.6. EVD infections in health workers in Guinea, Liberia, and Sierra Leone

(WHO, WHO|Health worker Ebola infections in Guinea, Liberia and Sierra Leone , 2015)

It has been observed that health workers are exposed and get infected.

Here is a graphic showing cases and death in health workers in Guinea, Liberia and Sierra Leone until May 9th, 2015.

Graphic 2 : Cumulative EVD infections in health workers in Guinea, Liberia, and Sierra Leone until May 9th, 2015



(WHO, Ebola Situation Report - 21 October 2015|WHO, 2015)

3.6.1. The main reasons why these health workers got infected are following

(WHO, WHO|Health worker Ebola infections in Guinea, Liberia and Sierra Leone , 2015)**:**

- Deficiencies in administrative controls especially in management of sick people, not enough training, and lack of policies.
- Lack of engineering and environmental controls especially hygiene and inadequate isolation barrier.
- problems with PPE, insufficient or inadequate ppe and inappropriate use of it
- Defective practices or exposure at the point of care
- Poor employment conditions and social determinants, weak remuneration, staff shortage.

3.6.2. Strategies to prevent health worker infections during the EVD epidemic

(WHO, WHO|Health worker Ebola infections in Guinea, Liberia and Sierra Leone ,

2015)

- WHO is working with MOHs and partners to establish strong IPC (infection prevention and control) and OHS (occupational health and safety)
- Put efforts aimed to implement optimal triage and isolation practices and minimum IPC standards in all health-care facilities, communicate targeted messaging to health workers and communities to raise awareness and change behaviors, and ensure continuous and timely provision of IPC supplies including PPE.
- WHO has deployed IPC and occupational health expertise and built the necessary IPC capacity to establish and sustain IPC practices in Ebola care facilities and routine health facilities.
- In all three countries with widespread and intense transmission, WHO has worked with MOHs to establish systems for the continuous monitoring, supportive supervision and improvement of IPC standards in Ebola facilities in order to ensure health-care workers' safety and prevent cross-transmission between patients. Following each assessment.
- WHO has developed guidance on IPC standards for care of Ebola patients including recommendations for selecting and using PPE in patient care and for hand hygiene in the context of Filovirus disease outbreak response.
- WHO also organized courses for environmental health officers and safety officers on the measures for basic occupational health and workplace improvement in health-care facilities.
- WHO has also carried out workplace assessments for the prevention of occupational health and safety risks, and is working to support the development of policies, procedures, protocols and training for the protection of occupational health and safety of health workers. Working with partners, WHO are supporting the expansion of access of health workers to healthcare and psychosocial support.

3.7. Successful Ebola responses in Nigeria, Senegal and Mali

(WHO, 2015)

It is an example of how at high risk countries responded to the EVD. We remember that countries at high risk were 14: Benin, Burkina Faso, Cameroon, Central Africa Republic, Côte d'Ivoire, Ethiopia, Gambia, Ghana, Guinea-Bissau, Mali, Mauritania, Niger, Senegal and Togo. The highest risk countries are 4 bordering countries of the 3 affected ones: Côte

d'Ivoire, Guinea-Bissau, Mali and Senegal. (WHO, WHO STRATEGIC RESPONSE PLAN West Africa Ebola Outbreak, 2015)

The three countries were ready to respond to an imported case and the rapid introduction of classical control measures. The government responded at the first case as emergency. Support from WHO epidemiologists at the start of the investigation was warmly welcomed. All three countries had their own high-quality laboratories, facilitating the rapid detection or discarding of cases. Contact tracing was rigorous and most identified contacts were monitored in isolation. Local staff and existing infrastructures were used in innovative ways. (See appendix 4: Successful Ebola responses in Nigeria, Senegal and Mali)

3.7.1. Lessons learned: how Nigeria and Senegal fought off EVD

(DALBERG, 2015)

The two countries' prior experience which are Senegal and Nigeria running coordinated campaigns on a large scale helped them launch effective responses that had more than a few things in common: technical expertise, quality infrastructure, new and old technology and coordinated actions.

3.8. Raising awareness in Community and hygiene promotion on EVD

The raising awareness is through media and Telecommunication campaigns and in public places and in villages . Senegal's fighting was not only achieved by controlling the EVD but also through SMS telephones driven platform to inform people. The keys WASH messages delivered to the people were ((WHO, WHO|Government of Senegal boosts Ebola awareness through SMS campaign, 2014):

- To wash hands with soap and water regularly as recommended
- To avoid touch sick or people dead of EVD
- To no eat the sick or dead animals

We also note that the technology helped in response of the EVD. In Senegal they use a diabetes text-messaging platform to spread information on Ebola, in Guinea there is contact tracing with a mobile phone application, in Liberia system links health workers and supervisors an application launched by the ministry of health and in Nigeria there is Mobile phone application which improved reporting in real time (DALBERG, 2015).

Figure 3 : Ebola campaign in Liberia village.

(CDC, 2015)

3.9. The full resilience and early recovery

The resilience to zero are is the coordinating actions to eradicate completely the EVD and strengthen the preparedness by defining and rapidly interrupt all remaining chains of Ebola transmission and identifying, managing and responding to the consequences of residual Ebola risks.

With a good coordination it will be possible to trace contacts in order to control the sources of EVD and impede its spreading. It is in all sectors that the coordination must be enhanced: the research in vaccines and therapies, raising awareness in lost contact and their treatment and recovery, impede the stigmatization and engaging community leaders and traditional healers to work together in oriented direction to the resilient zero environment. There is a need of hygiene promotion especially by hand washing regularly.

The preparedness should be strengthened and the training of health workers and capacity building of stakeholders in the field are main pillars to achieve the full resiliance.

IV. CONCLUSION AND RECOMMENDATIONS

4.1. Conclusion

The EVD in West African is unforgettable in memory of Africans. The West Africa region suffered in human resources and socio economically. The management of the EVD crisis is not ease as it requires much energy and resources and logistics. However some country have shown that is possible to control the EVD as they were having a preparedness plan and when the EVD entered their territories governments released quickly the funds to impede the spreading of it. The culture being one of the factor which can forbid the response management, it is necessary to work with tradition healers and coordinate together the efforts and resources for the resilience to zero and the arly recovery. Governments have to put their efforts raising awareness, foster the community participation in preventing the EVD spreading, in building quality infrastructures train and monitor the progress for the best achievement with resilience and the early recovery and update the response plans.

4.2. Recommendations

During the EVD outbreak there have been human and material resources. However Senegal, Mali, and Nigeria overcame to control this disease which means that it is possible to prevent and control the EVD. It is on this observation, that following recommendations are given:

- Establish the preparedness plan and revise the emergency response plan for the EVD in the WEST Africa especially in at risk countries
- Coordinate the researches on vaccine share information in order to channel the resilience to zero and the early recovery successfully
- Raise awareness in education, in public places in media, SMS within telephones, newspapers, radio, televisions, and enhance the community participation in preventing the infection and the spreading of EVD.
- Enhance the hygiene promotion best practices such as hand washing as recommended.
- Increase the capacity building of the stakeholders and training of health workers.
- Establish and fund the coordination in logistics and the psychological first aid initiative for the affected people and forbid the stigmatization by community participation.
- Governments have to mobilize and realize funds to in prevention of EVD.

- West African Governments have to work with partners in the humanitarian field towards the best result in fighting the EVD, heading to full resilience and early recovery.

4.3. Limitation

This topic is a good support for a humanitarian and all any person who is learning and gets informed about the fighting against the EVD. But the time limitation and advanced research in the field and others sources were needed in order to deepen the results and suitable point of the view in adequate way.

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APPENDIX SUMMARY

Appendix 1: Personal Protective Equipment (PPE)

All persons entering the patient room should wear at least:

• Gloves

• Gown (fluid resistant or impermeable)

• Eye protection (goggles or face shield)

• Facemask

• Additional PPE might be required in certain situations (e.g., copious amounts of blood, other body fluids, vomit, or feces present in the environment), including but not limited to:

• Double gloving

• Disposable shoe covers

• Leg coverings

Recommendations that all health worker should observe:

- **Protection of the mucosae of the eyes, nose and mouth**

- To have the mucous membranes of their eyes, mouth and nose completely covered by PPE while providing clinical care for patients with filovirus disease in order to prevent virus exposure
- To use either a face shield or goggles while providing clinical care for patients with filovirus disease in order to prevent virus exposure.
- To wear a fluid-resistant medical/surgical mask with a structured design that does not collapse against the mouth (e.g. duckbill, cup shape) while caring for patients with filovirus disease in order to prevent virus exposure.
- To use a fluid-resistant particulate respirator while caring for patients with filovirus disease during procedures that generate aerosols of body fluids in order to prevent virus exposure.

- **Gloves**

- To wear double gloves while providing clinical care for patients with filovirus disease in order to prevent virus exposure.
- Nitrile gloves are preferred over latex gloves for health workers providing clinical care for patients with filovirus disease in order to prevent virus exposure.
- To wear protective body wear in addition to regular on- duty clothing, (e.g. surgical scrubs), while caring for patients with filovirus disease in order to prevent virus exposure

- Compared with other forms of protective body wear, the choice of PPE for covering clothing should be either a disposable gown and apron, or a disposable coverall and apron; the gown and the coverall should be made of fabric that is tested for resistance to penetration by blood or body fluids or to blood-borne pathogens.

- **Footwear**

- To wear waterproof boots (e.g. rubber/ gum boots) while caring for patients with filovirus disease in order to prevent virus exposure.

- **Head cover**

- To wear a head cover that covers the head and neck while providing clinical care for patients with filovirus disease in order to prevent virus exposure.
- The head cover is suggested to be separate from the gown or coverall, so that these may be removed separately. (WHO, WHO|Personal protective equipment in the context of filovirus disease outbreak response, 2014)

Appendix 2: Principles of treatment in ECUs/CCCs

Treatment of patients with suspected or confirmed EVD

The syndromic approach', which means an approach based on patients' symptoms and signs is the one used in treatment of EVD case. (see appendix 1)

If a patient cannot eat or drink, help them to take frequent small sips. If it is difficult to access safe water, tea, soup, rice water or any locally preferred drink (not alcohol) can be provided. Patients with fever, especially those with diarrhoea and vomiting, should be encouraged to drink fluids and as much oral rehydration solution (ORS) as can be tolerated. We have also to take in considerations following indications:

- Malaria treatment should be provided to all patients with fever.
- Medicines to control symptoms can be given orally, injections are administrated cautiously as there big chance to get infected.
- Oral antibiotics may be given to treat apparent bacterial infections such as bacterial pneumonia or bacterial enteritis.
- Take and recording of the temperatures of the patient with a calibrated infrared thermometer
- Supervise and urge patients to take ORS, as this can be lifesaving. Use the guidelines to administrate the ORS (age, weight)
- In addition, give the patient Zinc sulphate, especially children: Encourage food and other fluids if tolerated.

Malaria patients

All patients presenting to ECUs/CCCs with fever should be given malaria treatment of Artesunate plus amodiaquine (AS+AQ) or Artemether-lumefantrine (AL) Or Dihydroartemisinin plus piperaquine (DHP+PQP)

Managing symptoms

Manage common EVD symptoms as described below. Reduce the dose after the first day, and make decisions about the cessation of treatment based on improvements in symptoms.

The table below shows the medicines administrated to patient according to the symptoms he or she presents.

Table 8:Managing symptoms

Symptoms	Medicine
Nausea, vomiting	Ondansetron
Diarrhoea	ORS and Zinc
Pain or Fever	Paracetamol
Epigastric pain	Omeprazole
Eye redness, discharge	Tetracycline
Agitation, confusion	Diazepam

Antibiotics

If a bacterial infection is suspected, use oral antibiotics following:

1. Lower respiratory infections (e.g., pneumonia) Amoxicillin
2. Gastroenteritis Ciprofloxacin

Nutrition

It is important to pay attention to the patient's nutrition. Provide as much food and drink as the patient can tolerate.

Pregnant women with EVD

- Provide care for EVD as for other patients.
- Be aware that EVD can cause miscarriage and foetal death in utero. In case of vaginal bleeding or foetal death in utero, within guidelines.
- Giving psychological aid is also adviced .

Discharging a patient from ECUs/CCCs

Should be discharged a patient in these following cases:

a. Patient with fever only and no other symptoms at admission

who doesn't have no more fever for 72 hours and no other symptoms and able to eat and carry out daily routine activities such as walking and washing themselves independently.

b. Patient with fever and other symptoms (e.g., diarrhoea, vomiting, bleeding) at admission who represent no fever for 72 hours, symptoms that may be associated with ongoing shedding of virus (e.g., diarrhoea, vomiting, bleeding) have completely

disappeared for 72 hours and able to eat and carry out daily routine activities such as walking and washing themselves independently.

c. If laboratory test are negative.

Advices to be given to discharged people

- Advice for men after discharge:
  - Virus remains in the semen for up to 3 months.
  - Condoms must be used during sexual contact.
- Advice for pregnant women on discharge:
  - Be aware/inform women and family that miscarriage and foetal death may occur.
  - If a pregnant woman who has recovered from EVD has a miscarriage, or is carrying a dead foetus, which she wishes to be delivered, refer her to an ETC or an obstetric centre equipped for good infection prevention and control (IPC) practices including PPE, for further care.
- If a mother survives EVD and the foetus is alive, advise her to stay close to an ETC until she gets labour pains.
- Advice for lactating women after discharge:
  - If the mother and baby are Ebola survivors, resume breastfeeding if the mother is able to.
  - If the baby was not infected, test the breast milk every 3 to 7 days and resume feeding when PCR testing on breast milk is negative.
  - Provide breast feeding support and counselling.

Appendix 3: Tracing of contact

Contact identification

When a patient is defined suspected, probable or confirmed and this apply to dead cases there is a need to establish the contact the victim has been exposed to.

The following information should be obtained:

- All persons who lived with the case
- All persons who visited the patient either at home or in the health facility since onset of illness.
- All places and persons visited by the patient since onset of illness
- All health facilities visited by the patient since onset of illness and all health workers who attended to the patient.
- All persons who had contact with the dead body from the time of death.

Contact listing

All persons considered to have had significant exposure to the cases should be listed as contacts with a listing form. Efforts should be made to physically identify every listed contact and inform them of their contact status, what it means, the actions that will follow, and the importance of receiving early care if they develop symptoms. The contact should also be provided with preventive information reduce the risk of exposing people close to them.

After they have to be briefed to stay at home and restrict contact with others , avid crowded places and the reporting of any suspicious sign and symptoms. Avoid using alarming information, such as 'Ebola has no treatment' or 'Ebola has a very high case fatality rate'.

Contact follow-up

After identifying the contact the follow up has to be implemented. It is done by surveillance staff/health workers from health facilities, community health workers, volunteers and community leaders. An efficient contact tracing system depends on a relationship of trust with the community, which in turn fosters optimum cooperation. The local surveillance and community volunteers should be involved as early as possible in the response. The local surveillance staff and community health workers should be closely supervised by trained epidemiologists/surveillance officers.

Then there are case management

Managing contacts with signs and symptoms

(WHO, Contact Tracing During an Outbreak of Ebola Virus Disease, 2014)

The contact tracing/follow-up team is usually the first to know when a contact has developed symptoms. If a contact develops signs and symptoms, the responsible team should immediately notify the supervisor. Then follows the evacuation of the symptomatic contact to the treatment centre.

Contact discharge

(WHO, Implementation and management of contact tracing for Ebola virus disease , 2015)

Contacts should be seen and interviewed on the 21st day of follow-up and, in the absence of any symptoms compatible with EVD, the contacts can be discharged from the contact follow-up process. Contacts may also be discharged if during the follow-up process it is discovered and verified that the individual did not have an EVD exposure and was erroneously listed as a contact.

Appendix 4: Successful Ebola responses in Nigeria, Senegal and Mali

(WHO, WHO|Successful Ebola responses in Nigeria, Senegal and Mali, 2015)

1. Nigeria

When a traveller by air reached Lagos it was the day the EVD entered in Nigeria. He presented symptoms during the flight such as vomiting. He was transferred to the hospital and the protocol officer who accompanied him died later on with 9 doctors and nurses who among them 4 died become infected. The traveller said he was having Malaria. It was chaotic but the country responded with a coordinated leadership for a good response. As in Senegal, an emergency operations centre was established, supported by the WHO country office. Also like Senegal, Nigeria had a first-rate virology laboratory, affiliated with the Lagos University Teaching Hospital, able to diagnose EVD.

It is through serious campaign , communication on local radio , television in different dialects cutting-edge technologies in place for polio eradication, were repurposed to support the Ebola response , GPS system in contact and daily mapping of transmission chains. Contact tracing reached 100% in Lagos and 99.8% in Port Harcourt.

The country had 17 cases and 9 deaths.

2. Senegal

The first case in Senegal was confirmed on 29 August in a young man who travelled to Dakar, by road, from his home in Guinea, where he had been in direct contact with an Ebola patient. WHO dispatched three senior epidemiologists with extensive frontline experience in containing some of history's largest Ebola outbreaks. These epidemiologists worked shoulder-to-shoulder with staff from the Ministry of Health, MSF, and CDC to undertake urgent and thorough contact tracing. All contacts were monitored daily and those with symptoms were immediately tested. All test results were negative. No onward transmission occurred. The single case fully recovered. WHO declared Senegal free of virus transmission on 17 October, 42 days after the second test on that single patient came back negative.

3. Mali

When Mali confirmed its first case on 23 October, in a two-year-old child from Guinea who later died, the country had been on high alert for months. Mali experienced a dress-rehearsal

for imported Ebola cases in early April, when six suspected cases were detected and placed under observation. An isolation facility in Bamako, designed for the management of Lassa fever patients, was repurposed to safely receive the suspected cases for close monitoring. Patient samples were tested at the CDC in Atlanta and the Pasteur Institute in Dakar. All test results were negative. On 25 October, a person was admitted to Bamako's Pasteur Clinic with a diagnosis of acute kidney failure. He died on 27 October. That single hospital admission ignited a chain of transmission that eventually led to 7 cases and 5 deaths, including 2 health workers. The country was ready for the emergency and hundreds of contacts were put under observation. Isolation units were built and the free line established. Some suspected cases were reported. All such reports were investigated. No further cases were identified. After 21 days of observation people were released.